YOLO-SOLANO AIR QUALITY MANAGEMENT DISTRICT

1947 Galileo Court, Suite 103; Davis, CA 95618

Emission Evaluation

ATC # C-10-65
SIC Code # 3086
UTM E ____ km
UTM N ____ km

ENGINEER: Courtney Graham

FACILITY NAME: Insulfoam, LLC

LOCATION: The equipment will be located at 1155 Business Park Drive in Dixon. The equipment will not be located within 1,000 feet of a K-12 school and is not subject to the requirements of H&S 42301.6.

PROPOSAL: The applicant is proposing to install two new lines for the manufacturing of structural insulated panels (SIPs). The process will utilize slabs of EPS block (that is manufactured at the plant under a separate permit) to build an insulated panel. A sheet of oriented strand board (OSB) is attached to each side of the EPS slab, which is then further processed.

The OSB boards are trimmed to the proper size using a saw while the EPS cores are cut to the proper size using hot wire cutters. The EPS cores have adhesives applied to both sides using a roll coater. The coated EPS cores are placed between sheets of OSB, then placed into a press to cure. After pressing and curing, the panels are further processed in the fabrication area. This consists of cutting with hand held saws and routers, recessing the panel edges , caulking seams, and adhering dimensional lumber. The panels are finished by edge sealing for moisture, additional EPS trimming, insect and moisture repellent treatments, and identification markings on panels.

PROCESS: Structural Insulated Panel Manufacturing

FLOW DIAGRAM: See application

EQUIPMENT: Roll Press #1: One roll coater, 3 hp, with a 9' x 32' panel press, 16 hp; Roll Press #2: One Roll Coater, 3 hp, with a 8' x 24' panel press, 8 hp; one slabber, 3 hp; one Hendrick Saw, 8 hp; one Spline Saw, 19 hp; one Octopus, 2 hp; and one Router, 44 hp.

CONTROL EQUIPMENT: One Donaldson Torit Cyclone, 3000 cfm, serving the Hendrick saw; One Donaldson Torit cyclone, 8250 cfm, serving the fabrication cells, router, and spline saw; one Donaldson Torit baghouse, model DFT3-24, 12000 cfm, serving both cyclones.

APPLICATION DATA:

Panels		Units	Formula Symbol	Reference
Daily Throughput =	100,000	square feet	Td	Applicant
1st Quarter Throughput =	750,000	square feet	T1	Applicant
2nd Quarter Throughput =	750,000	square feet	T2	Applicant
3rd Quarter Throughput =	750,000	square feet	T3	Applicant
4th Quarter Throughput =	750,000	square feet	T4	Applicant
Yearly Throughput =	2,500,000	square feet	Ty	Applicant
Adhesive				
Daily Throughput =	472	lbs	Tda	Applicant
1st Quarter Throughput =	42,990	lbs	T1a	Applicant
2nd Quarter Throughput =	42,990	lbs	T2a	Applicant
3rd Quarter Throughput =	42,990	lbs	T3a	Applicant
4th Quarter Throughput =	42,990	lbs	T4a	Applicant
Yearly Throughput =	143,301	lbs	Tya	Applicant
Caulking Mastic				
Daily Throughput =	262	lbs	Tdc	Applicant
1st Quarter Throughput =	1,965	lbs	T1c	Applicant
2nd Quarter Throughput =	1,965	lbs	T2c	Applicant
3rd Quarter Throughput =	1,965	lbs	T3c	Applicant
4th Quarter Throughput =	1,965	lbs	T4c	Applicant
Yearly Throughput =	6,550	lbs	Tyc	Applicant

Solvent				
Daily Throughput =	13	lbs	Tds	Applicant
1st Quarter Throughput =	1,226	lbs	T1s	Applicant
2nd Quarter Throughput =	1,226	lbs	T2s	Applicant
3rd Quarter Throughput =	1,226	lbs	T3s	Applicant
4th Quarter Throughput =	1,226	lbs	T4s	Applicant
Yearly Throughput =	4,086	lbs	Tys	Applicant
Edge Sealant				
Daily Throughput =	30	lbs	Tde	Applicant
1st Quarter Throughput =	225	lbs	T1e	Applicant
2nd Quarter Throughput =	225	lbs	T2e	Applicant
3rd Quarter Throughput =	225	lbs	T3e	Applicant
4th Quarter Throughput =	225	lbs	T4e	Applicant
Yearly Throughput =	750	lbs	Tye	Applicant
Operating Schedule				
Daily =	24	hours	Tdo	Applicant
Quarter 1 =	90	days	T1o	Applicant
Quarter 2 =	91	days	T2o	Applicant
Quarter 3 =	92	days	T3o	Applicant
Quarter 4 =	92	days	T4o	Applicant
Annual =	365	days	Tyo	Applicant

ASSUMPTIONS:

The adhesive and the solvent used in this process both have special properties which necessitate specific calculations for amount of VOC emitted, rather than the traditional assumption of 100% VOC content emitted. The adhesive contains Methylene Diphenyl Diisocyanate (MDI),which almost completely reacts when applied, therefore there are very few fugitive emissions. Also, the solvent used has an extremely low vapor pressure, which causes very little of the VOC to be emitted.

		Units	Formula Symbol	Reference
baghouse air flow =	12,000	cfm	cfm	applicant flow chart
Process temperature =	300	K	T	applicant
Airflow speed =	0.1	m/s	u	applicant
MDI vapor pressure =	1.72E-08	atm	Vpmdi	applicant
MDI molecular weight =	250		Mw	applicant
MDI Exposed surface area =	18,587	square meter	Sa	applicant/throughput limit
MDI Tack free time =	1	second	tTF	applicant
Solvent molecular weight =	160		M	applicant
Solvent exposed surface area =	2.89	square feet	A	equivalent to 55 gal drum
Gas Law constant =	82	atm*cm3/gmol*K	R	Factor
Solvent vapor pressure =	0.15	mmHg	P	MSDS
Conversion =	453.6	grams/lb	g	District
Conversion =	1,440	minutes/day	m	District

EMISSION FACTORS:

		Units	Formula Symbol	Reference
VOC, adhesive	1.12E-03	g/day	EFvocA	*See calculation below
VOC, mastic	0.02	lb/lb	EFvocM	MSDS
VOC, solvent	2.45E-05	lb/min	EFvocS	**See calculation below
VOC, sealant	0.04254	lb/lb	EFvocE	MSDS
PM10	0.0004	gr/dscf	EFpm	SJVAPCD Woodworking GEAR 4/28/08

*$W = 25.4*Vp_{mdi}*(M_w/T)*(u)^{0.78}* S_a*t_{TF}$; from "MDI/Polymeric MDI Emissions Reporting Guidelines for the Polyurethane Industry", Alliance for Polyurethanes Industry,2004

**$E = (0.284)*(u)0.78*M^{0.667}*A*P/(R*T)$; from "Technical Guidance for Hazards Analysis", USEPA, 1987

EMISSION CALCULATIONS:

1. Determine VOC Emissions:

Max Daily VOC Emissions = (Efvoca/g)+(EFvocM*Tdc)+(EFvocS*m)+(EFvocE*Tde)	=	6.2	lb/day
1st Quarter VOC Emissions = (Efvoca/g)*T1o+(EFvocM*T1c)+(EFvocS*m)*T1o+(EFvocE*T1e)	=	49	lb/quarter
2nd Quarter VOC Emissions = (Efvoca/g)*T2o+(EFvocM*T2c)+(EFvocS*m)*T2o+(EFvocE*T2e)	=	49	lb/quarter
3rd Quarter VOC Emissions = (Efvoca/g)*T3o+(EFvocM*T3c)+(EFvocS*m)*T3o+(EFvocE*T3e)	=	49	lb/quarter
4th Quarter VOC Emissions = (Efvoca/g)*T4o+(EFvocM*T4c)+(EFvocS*m)*T4o+(EFvocE*T4e)	=	49	lb/quarter
VOC Emissions = (Efvoca/g)*Tyo+(EFvocM*Tyc)+(EFvocS*m)*Tyo+(EFvocE*Tye)*(1 ton/2,000 lb)	=	0.08	tons/year

2. Determine PM10 Emissions:

Max. Daily PM10 Emissions = Efpm * cfm * 1/7000 gr/lb * 60 min/hr * 24 hr/day =	1.0	lb/day
1st Quarter PM10 Emissions = T1o * Daily =	89	lb/quarter
2nd Quarter PM10 Emissions = T2o * Daily =	90	lb/quarter
3rd Quarter PM10 Emissions = T3o * Daily =	91	lb/quarter
4th Quarter PM10 Emissions = T4o * Daily =	91	lb/quarter
Max. Yearly PM10 Emissions = (Tyo * Daily)*(1 ton/2,000 lb) =	0.18	tons/year

RULE & REGULATION COMPLIANCE EVALUATION:

District Rule 2.3-Ringelmann
Visible emissions from the operation are expected to comply with the 20% opacity rule limit.

District Rule 2.5-Nuisance
The operation is expected to comply with the rule requirement of no discharge which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or the public. A condition will not be placed on the ATC, but will be added to the PTO upon implementation.

District Rule 2.11-Particulate Matter

Emission Rate (gr/dscf)	Allowable Rate (gr/dscf)	Compliance
0.0004	0.1	Yes

District Rule 2.13-Organic Solvents
Per Section 110.2, the provisions of this rule do not apply to this operation due to the use of equipment for which other requirements specified in other District rules.

District Rule 2.19-Particulate Matter Process Emission Rate

Emission Rate (lb/hr)	Allowable Rate (lb/hr)**	Compliance
0.04	10	Yes

*It is assumed that TSP is equivalent to PM10 for this operation
**corresponding to a process rate of 9,494 lb/hr

District Rule 2.31-Surface Preparation and Cleanup
Per section 110.4 of the rule (the source is using solvent to strip cured adhesives), only section 503 of the rule is applicable
A condition will be placed on the permit to ensure compliance with section 503.

District Rule 2.33-Adhesive Operations
This rule is applicable to the operation.
Section 300-The sealant will have a limit of 420 g/L (other sealants not listed). The sealant currently proposed for use is compliant (5 gr/L). The adhesive will have a limit of 120 g/L (porous material). The current adhesive is a zero-VOC product
Section 302-The source is currently proposing to use a roll coat application method.
Section 304-A condition will be placed on the permit
Section 305-The solvent complies with Rule 2.31.
Section 500-Appropriate recordkeeping will be required.

District Rule 3.4-New Source Review

PROPOSED EMISSION SUMMARY FOR NEW OR MODIFIED PERMIT

	Daily	*Yearly*	
VOC	6.2 lb	0.08 tons	Use for annual billing
CO	0.0 lb	0.00 tons	Use for annual billing
NOx	0.0 lb	0.00 tons	Use for annual billing
SOx	0.0 lb	0.00 tons	Use for annual billing
PM10	1.0 lb	0.18 tons	Use for annual billing

	Quarterly			
	1st	2nd	3rd	4th
VOC (lb)	49	49	49	49
CO (lb)	0	0	0	0
NOx (lb)	0	0	0	0
SOx (lb)	0	0	0	0
PM10 (lb)	89	90	91	91

*Previous quarterly potential to emit for modified permit**

	1st	2nd	3rd	4th
VOC (lb)	0	0	0	0
CO (lb)	0	0	0	0
NOx (lb)	0	0	0	0
SOx (lb)	0	0	0	0
PM10 (lb)	0	0	0	0

* This is a new permitted unit

*Historic potential emissions for modified permit**

	1st	2nd	3rd	4th
VOC (lb)	0	0	0	0
CO (lb)	0	0	0	0
NOx (lb)	0	0	0	0
SOx (lb)	0	0	0	0
PM10 (lb)	0	0	0	0

* This is a new permitted unit

BACT

Pollutant	Trigger (lb/day)	Proposed (lb/day)	Quarterly Increase	BACT
VOC	10	6	Yes	No
CO	250	0	No	No
NOx	10	0	No	No
SOx	80	0	No	No
PM10	80	1	Yes	No

OFFSETS

*Quarterly permitted emissions for other permits at the stationary source**

	1st	2nd	3rd	4th
VOC (lb)	111,702	111,685	111,685	111,707
CO (lb)	14,067	14,067	14,067	14,067
NOx (lb)	2,354	2,354	2,354	2,354
SOx (lb)	22	22	22	22
PM10 (lb)	422	321	322	410

* See attached spreadsheet

Quarterly permitted emissions for the stationary source including proposed emissions

	1st	2nd	3rd	4th
VOC (lb)	111,751	111,734	111,734	111,756
CO (lb)	14,067	14,067	14,067	14,067
NOx (lb)	2,354	2,354	2,354	2,354
SOx (lb)	22	22	22	22
PM10 (lb)	511	411	413	501

Offset triggers

	1st	2nd	3rd	4th
VOC (lb)	7,500	7,500	7,500	7,500
CO (lb)	49,500	49,500	49,500	49,500
NOx (lb)	7,500	7,500	7,500	7,500
SOx (lb)	13,650	13,650	13,650	13,650
PM10 (lb)	13,650	13,650	13,650	13,650

*Quantity of offsets required**

	1st	2nd	3rd	4th
VOC (lb)	49	49	49	49
CO (lb)	0	0	0	0
NOx (lb)	0	0	0	0
SOx (lb)	0	0	0	0
PM10 (lb)	0	0	0	0

*Per Policy 21, the District considers emissions changes below 50 lbs in any quarter to be zero.

MAJOR MODIFICATION

Facility Total Potential to Emit		*Major Source Thresholds*	
175.24	TPY VOC	25	TPY VOC
28.45	TPY CO	100	TPY CO
4.77	TPY NOx	25	TPY NOx
0.04	TPY SOx	100	TPY SOx
0.97	TPY PM10	100	TPY PM10

Last five year emission aggregate		*Major Modification Thresholds*	
0.08	TPY VOC	25	TPY VOC
0.00	TPY CO	100	TPY CO
0.00	TPY NOx	25	TPY NOx
0.00	TPY SOx	40	TPY SOx
0.18	TPY PM10	25	TPY PM10

Result: The proposed modification is not a major modification

PUBLIC NOTICE

"Increase in historic potential to emit"		*Exemption level for notification*	
49	lb VOC/quarter	7,500	lb VOC/quarter
0	lb CO/quarter	49,500	lb CO/quarter
0	lb NOx/quarter	7,500	lb NOx/quarter
0	lb SOx/quarter	13,650	lb SOx/quarter
91	lb PM10/quarter	13,650	lb PM10/quarter

Result: Public notice is not required

District Rule 3.8-Federal Operating Permits

The applicant has not requested enhanced new source review, therefore a separate application for modification of the Title V permit is required. The changes reflected in this ATC will be proposed in the modified Title V.

District Rule 3.20-Ozone Transport Mitigation

This emissions unit does emit VOCs or NOx, and therefore, per section 110.3, this application is not exempt from this rule.

Annual permitted emissions for the stationary source including proposed emissions

VOC (lb)	350,480	lbs
NOx (lb)	9,540	lbs

Annual permitted emissions for equipment which is exempt from Rule 3.4

VOC (lb)	0	lbs
NOx (lb)	0	lbs

Post -project Stationary Source Potential to Emit (SSPE)

VOC (lb)	350,480	lbs
NOx (lb)	9,540	lbs

Because the post-project SSPE is greater than 10 tons (20,000) lbs per year for VOC or NOx, per section 301.1, calculations shall be performed to determine the quantity of mitigation required, if any.

Pre -project Stationary Source Potential to Emit (SSPE)

VOC (lb)	350,320	lbs
NOx (lb)	9,540	lbs

Quantity of offsets required by Rule 3.4

VOC (lb)	0	lbs
NOx (lb)	0	lbs

*Quantity of Mitigation required by Rule 3.20**

VOC (lb)	160	lbs
NOx (lb)	0	lbs

*As discussed above, per policy 21, emission changes less than 50 lbs per quarter are considered to be zero.

District Risk Management Plan and Risk Assessment Guidelines (RMPRAG)
As required by the District's RMPRAG Policy, the project's health risk is reviewed below.

Pollutant	Emissions* (lb/year)	Screening Level (lb/year)	Less Than Screening
Isocyanates	9.05E-04	18.3	Yes

*Calculated by: Emissions = EFvocA * g * 365; EFvocA assumes 100% of adhesive contains MDI, as worst case calculation.

Since the emissions from the above HAP is below the screening level contained in the RMPRAG,
no further toxics review is required.

COMMENTS: BACT is not triggered, public notice is not required and the proposal is not a major modification.

The following conditions will be required per District Rule 3.4, as a result of this evaluation:
-The opacity from the baghouse exhaust will be limited to 5%
-The particulate matter concentration will be limited to the calculated value rather than the Rule 2.3 limit.
-All control equipment must be properly maintained.
- Material collected in the baghouse will be disposed of in a manner preventing emissions.
-To maintain exemption from Rule 2.31 limits, solvents may only be used to strip cured adhesives, as proposed by the applicant.
-Maintenance of records of calculated VOC emissions and woodworking operating hours.
-Records will be retained for 5 years.

RECOMMENDATIONS: Issue the Authority to Construct.

Engineer: _____ **Date:** _____

Reviewed by: _____ **Date:** _____

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